E-Poster

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Cervical Spine Injuries in Elite Rugby Players: An Electromyographic Study

Topic: Specific Target Groups (Children, Women, Elderly, Athletes, Musicians, Refugees, Ethnic Groups, Workers, and Others)

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BACKGROUND

Rugby is a high-contact sport played worldwide, exposing athletes to significant injury risks, particularly cervical spine trauma and concussions. While concussions are more frequent inwards due to high-impact collisions, repeated mechanical overload can also contribute to long-term cervical dysfunctions, including reduced mobility and muscular imbalances. These factors may increase the probability of musculoskeletal injuries and chronic conditions such as cervicalgia. Advanced tools like surface electromyography (sEMG) and inertial sensors provide valuable insights into muscle activation patterns, aiding in early detection of neuromuscular dysfunctions. This study aims to assess cervical muscle coordination, symmetry, and range of motion (ROM) in professional rugby players, investigating their correlation with concussion history and training frequency to inform injury prevention strategies.

METHODS

This observational cross-sectional study was conducted following the STROBE guidelines. Thirty-six male professional rugby players with at least two years of experience were recruited from Zebre Rugby Club and Rugby Colorno. An anamnestic assessment was performed to collect data on each player's injury history, then prior informed consent, sEMG probes were applied to the sternocleidomastoid and cervical paraspinal muscles, while an inertial sensor was positioned on the head. Athletes performed lateral bending, flexion-extension, and rotational head movements. Data analysis provided insights into head kinetics, energy content, muscle symmetry, and activation timing. Pearson's correlation coefficients were used to assess statistical relationships between variables.

RESULTS

Thirty-six male rugby players participated, including 25 forwards (14 1st-line, 11 2nd/3rd-line) and 11 backs. Most athletes trained their necks 0 to 2 times per week, with 30.6% performing two sessions weekly. Regarding concussion history, 38.9% reported no concussions, and 41.7% had one concussion. Flexion movements showed the best muscle symmetry, with 72.2% of players achieving > 90% symmetry in sternocleidomastoid muscles. Lateral bending and rotation exhibited lower symmetry, especially in the sternocleidomastoid muscles. Significant correlations were found in ROM, with forwards showing reduced ROM in bilateral head rotation and flexion. Backs demonstrated significantly higher ROM across all movements, particularly in bilateral head rotations.

CONCLUSION

This study highlights that personalized rehabilitation programs focusing on strengthening, mobility, and proprioception training could help mitigate injury risks and improve performance, while no direct correlation was found between concussions and cervical muscle imbalances.

Statement of Disclosures

None

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